

FIELD OF THE INVENTION

This invention relates generally to print and print-publishing prepress, and more particularly to such prepress that is computerized.

BACKGROUND OF THE INVENTION

The publishing process typically requires several steps to successfully complete a printed publication. Such steps include planning and organizing, design and content development, and prepress tasks where electronic files are prepared to be reproduced with ink on paper. Broadly speaking, prepress involves the preparation of all the electronic files that will be utilized to create a publication printed with paper and ink. For a professional publication, this usually involves utilizing an authoring program to create the electronic version of the publication itself, and then using another program (which may be a component of the authoring program), to translate this electronic version into a format from which paper and ink copies of the publication can be printed.

Portions if not all of the prepress process is difficult for non-professionals to accomplish, however. While tools such as Adobe PageMaker and Quark Express enable professionals to more easily create professional-looking documents, most non-professionals find these computer programs overly complex and difficult to use. That is, although the computers sitting on the desks of such non-professionals are sufficiently powerful to handle such tasks, the users themselves may not be sufficiently knowledgeable to perform them. Furthermore, even for experienced professionals, the prepress process is fraught with uncertainty; for example, the professional must know the type of paper and ink output that is desired a priori before translating an electronic version of a document into a format from which paper and ink copies can be printed. That is, even for experienced professionals, the prepress process is not tightly integrated enough to attain fast, easy and cost-effective print publishing.

SUMMARY OF THE INVENTION

5 The above-identified shortcomings as well as other shortcomings and problems are addressed by the present invention, which will be understood by reading and studying the following specification. In one embodiment, a computerized prepress system includes three components: a server, a client and a printer. The server has stored thereon an authoring program to create a document, and a translation program to translate the document to a suitable prepress format. The client downloads the authoring program from the server to create the document, and then uploads the document to the server for translation to the suitable prepress format. The printer receives the document as translated to the suitable prepress format from the server, such that the printer may then print copies of the document.

10 More specifically, in one particular embodiment of the invention, the authoring program is written in the programming language Java, and the client, server and printer are each connected to an intranet the Internet. Thus, a user at the client needs only to run a web browser program, such as Netscape Navigator, to access the server and download and run the authoring program. Once the user has created a document with the authoring program, it is saved at the server. The server may then as required translate the document into a suitable prepress format -- such as PostScript -- and send it to the printer (e.g., as a MIME-compliant electronic mail) for printing.

20 The invention thus provides for several advantages. The user at the client does not need to know anything about the prepress format required by the printer. Since the server stores the authoring program that is then downloaded to the client for creation of a document, the server can maintain the authoring program such that it knows both the format to which the authoring program saves the document, and the format to which the document must be translated for printing at the printer. Furthermore, the authoring program stored at the server may be as simple as necessary for novice users to comfortably use, or as powerful as necessary for experienced users to use. The professional user benefits from the tight integration of the invention, in that the professional user need only be concerned with creating the document, and not the manner by which the document will ultimately be printed with paper and ink, which may already be preselected within the server.

In different embodiments of the invention, computerized methods, computerized systems, computers, and computer-readable media of varying scope are described. Still other and further embodiments, aspects and advantages of the invention will become apparent by reference to the drawings and by reading the following detailed description.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram of a computer in conjunction with which embodiments of the invention may be implemented;

FIG. 2 is a diagram of a computerized prepress system in accordance with one embodiment of the invention;

FIG. 3 is a diagram of a computerized prepress method in accordance with one embodiment of the invention; and,

FIGS. 4a-4m are diagrams of screens displayed on a display device of a computer in conjunction with one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

In the following detailed description of the preferred embodiments, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific preferred embodiments in which the inventions may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that logical, mechanical and electrical changes may be made without departing from the spirit and scope of the present invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is defined only by the appended claims.

Referring first to FIG. 1, a diagram of a computer in conjunction with which embodiments of the invention may be implemented is shown. Computer 110 is operatively coupled to display device 112, pointing device 114, and keyboard 116. Computer 110 includes a processor (preferably, an Intel Pentium processor), random-access memory (RAM) (preferably,

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at least thirty-two megabytes), read-only memory (ROM), and one or more storage devices, such as a hard disk drive, a floppy disk drive (into which a floppy disk can be inserted), an optical disk drive, and a tape cartridge drive. The memory, hard drives, floppy disks, etc., are types of computer-readable media. The hard drives and floppy disks are more specifically types of nonvolatile store media. Computer programs running on the computer are executed by the processor from the computer-readable media. The invention is not particularly limited to any type of computer 110. Computer 110 preferably is a PC-compatible computer or a MacOS-compatible computer. The construction and operation of such computers are well known within the art.

Furthermore, computer 110 may be communicatively connected to the Internet via a communication device, any particular manner by which the invention is not limited to, and which is not shown in FIG. 1. Internet connectivity is well known within the art. In one embodiment, the computer includes a communication device that is a modem and corresponding communication drivers to connect to the Internet via what is known in the art as a "dial-up connection." In another embodiment, the computer includes a communication device that is an Ethernet or similar hardware (network) card to connect to a local-area network (LAN) that itself is connected to the Internet via what is known in the art as a "direct connection" (e.g., T1 line, etc.).

Computer 110 also has at least one operating environment running thereon, each desirably providing a graphical user interface including a user-controllable pointer. Such operating environments include operating systems such as versions of the Microsoft Windows and Apple MacOS operating systems known in the art. The invention is not limited to any particular operating environment, however, and the construction and use of such operating environments are well known within the art. Computer 110 also desirably has at least one web browser application program running with at least one operating environment, to permit users of computer 110 to access intranet or Internet world-wide-web pages as addressed by Universal Resource Locator (URL) addresses. Such browser application programs include Netscape Navigator and Microsoft Internet Explorer.

Display device 112 permits the display of information, including computer, video and

other information, for viewing by a user of the computer. The invention is not limited to any particular display device 112. Such display devices include cathode ray tube (CRT) displays (monitors), as well as flat panel displays such as liquid crystal displays (LCD's). Pointing device 114 permits the control of the screen pointer provided by the graphical user interface of operating systems such as versions of Microsoft Windows. The invention is not limited to any particular pointing device 114. Such pointing devices include mice, touch pads, trackballs, remote controls and point sticks. Finally, keyboard 116 permits entry of textual information into computer 110, as known within the art, and the invention is not limited to any particular type of keyboard.

Referring next to FIG. 2, a diagram of a computerized system in accordance with one embodiment of the invention is shown. Each of client computer 200, server computer 202, and printer computer 204 is a computer, such as that shown in and described in conjunction with FIG. 1, although the invention is not so limited. Thus, each of client computer 200, server computer 202, and printer computer 204 has a processor, a computer-readable medium from which computer programs are executed by the processor, and a communications device, such as a network card, or a modem. Client computer 200, server computer 202, and printer computer 204 are communicatively coupled to one another via the Internet 206. Note that in one embodiment, Internet 206 is replaced by an extranet or an intranet, as known within the art, and as may be found in corporate and other environments.

Server computer 202 is desirably an extranet, intranet or Internet world-wide-web server, as known in the art, such that it has assigned thereto a Universal Resource Locator (URL) address to permit client computer 200, as well as other computers, to access the server. The invention is not particularly limited to a type of server 202. Typical examples include those running software available from Netscape, Microsoft, Apache, NCSA, and others. Server 202 is also not limited to running on a particular operating system (OS); common operating systems including Microsoft Windows 95, Microsoft Windows NT, Apple MacOS and UNIX.

Server computer 202 has stored thereon authoring program 208. Authoring program 208 is downloaded from server 202 by and to client 200 through the Internet 206, although this is more directly represented by arrow 210. Authoring program 208 desirably is run within

operating environment 212 running on client 200. Such an operating environment 212 includes those provided by extranet, intranet and Internet world-wide-web browser programs such as Microsoft Internet Explorer and Netscape Navigator. For example, in one embodiment, authoring program 208 is coded in the programming language Java, such that program 208 is a
5 Java applet that is downloaded through the Internet by client 200, and runs within an operating environment 212 that is a browser program that is Java capable. In other embodiments of the invention, authoring program 208 may be coded in the programming language Perl, C, C++, ActiveX, or other programming languages; the invention is not so limited.

Authoring program 208 is used within client computer 200 to create document 214.

10 Document 214 is a document created by the user of computer 200, using authoring program 208, for printing and publishing. The invention is not limited to any type of authoring program 208; in one embodiment of the invention, authoring program 208 is that which is shown in and will be described in conjunction with FIGs. 4a-4m. The invention is also not limited to any particular document 214. In one embodiment of the invention, document 214 is a business card; however, other documents amenable to the invention include letterheads, pamphlets, brochures, envelopes, etc.

Once document 214 has been created at client 200, it is uploaded to server 202 for saving at the server, through the Internet 206, as more directly represented by arrow 216. Document 214 is saved at the server 202 on a non-volatile storage device of the server, such as a hard disk drive. It is saved in an internal file format that maximizes efficiency in the storage of the document. Once the document 214 is ready to be sent to a printer for printing and publication (as may be indicated by client 200 to server 202), server 202 runs translation program 218 on document 214 (program 218 being stored on server 202) as saved in the internal file format to generate a translated document 220, as represented by arrow 222. The translation program 218
25 translates document 214 into a file format suitable for prepress, such as PostScript. Other file formats suitable for prepress include HTML, PDF, and PostScript extreme, as known within the art. Translation program 218 performs any color separations, or other operations as required by the suitable prepress file format. The invention is not limited to any particular suitable prepress file format.

Server 202 then transmits the translated document 220 through the Internet 206 to printer 204, as more directly represented by arrow 224. In one embodiment, this is accomplished by server 202 attaching the translated document 220 as an attachment file to a MIME-compliant electronic mail, which may then be sent to the electronic mail address of printer 204. However, the invention is not limited to any manner by which such transmission occurs. Once the printer 204 has received the translated document 220, document 220 may then be printed and published as needed.

Referring next to FIG. 3, a flowchart of a computerized method according to an embodiment of the invention is shown. This method is inclusive of the steps or acts required to be taken by a client computer, a server computer, and a printer computer to create a document at the client computer, for translation by the server computer, and for printing at the printer computer, in accordance with one embodiment of the invention. These steps or acts are performed in accordance with one or more computer programs, such as authoring programs, and translation programs, as have been described in conjunction with FIG. 2. The embodiment of the invention described in conjunction with FIG. 3 refers to the situation where the client, the server and the printer are communicatively coupled to one another through the Internet, where the client is running a web browser program and the server is a web server; however, the invention is not so limited.

In step 300, the client computer accesses the web site of the web server, as referenced by a URL address, through its web browser program, and logs onto the web server. Logging on to the server desirably includes submitting user information regarding the user at the client, such as the user's name and password. Once the server has received this information, it authenticates the user, looking up the user information submitted to determine whether such a user exists, and whether the password for the user is correct. Authentication also includes associating the user with a particular directory on the server computer (e.g., on which to store the documents created by the user), a set of defaults regarding options available to the user within the authoring program (e.g., fonts, colors, images and commands), and an authorization level. The authorization level dictates what the user is permitted to do within the program; for example, a "normal" user may be allowed to create, save and print his or her own documents, an

"administrator" may be permitted to access anyone's documents within the administrator's work group, and a "demonstration" user is permitted to create documents, but not permitted to save or print them.

5 In step 302, the client downloads the authoring program from the server. As has been described, in one embodiment the authoring program is coded in Java, such that the program is a Java applet running within the browser program of the client. In step 304, the client then uses the authoring program to create a document, such as a business card, a letterhead, etc. Once the document has been created, in step 306 the client selects a save command, which uploads the document to the server, where it is saved. Steps 300 through 306 are iterative; the user at the client may continually save the document to the server, and then relogin at a subsequent time to again revise the document.

10 Once the document is in final form according to the user, the user selects a print command in step 308. This signals the server to translate the document into a suitable prepress format, such as PostScript, or another format as previously described, and send the document to the printer computer in step 310, such as an electronic mail attachment. Thus, the internal format in which the document is saved in step 306 is different than the format to which the document is translated in step 308 and sent to the printer in step 310. Once the printer receives the document, the document may then be printed and published.

20 Referring next to FIGs. 4a-4m, diagrams of screens displayed on a display device of a computer in conjunction with one embodiment of the invention are shown. More particularly, the diagrams are screens regarding an authoring program according to one embodiment of the invention. Referring first to FIG. 4a, within display device 400 is operating environment window 402 within which the authoring program runs. Specifically, operating environment window 402 is part of a web browser program, such as Netscape Navigator. The authoring program is a Java applet that runs within the web browser. The authoring program includes six primary areas: menu bar 404, tool bar 406, orientation bar 408, work area 410, color palette area 412, and properties area 414. The user of the computer utilizes tool bar 406, orientation bar 408, menu bar 404, color palette area 412, and properties area 414 as tools to create a document within work area 410. Work area 410 is sized in accordance with the type of document to be

created. For example, as shown in FIG. 4a, the type of document to be created is a business card. The properties area 414 shows commands that may be used in conjunction with the currently selected tool from tool bar 406.

Clicking "file" on menu bar 404 drops down the file menu, as shown in FIG. 4b. The file menu permits a user to create a new document, such as a business card, letterhead, or envelope, insert an image, open or save a document, revert the current work area to the document as most recently saved, or print to a file (i.e., cause the translation program to be run). The images are saved as files on the server in a particular format, such as encapsulated PostScript, TIFF, GIF, and JPEG. Desirably, the images have a maximum resolution of 1:1, to minimize the size of the encapsulated PostScript file (or file in another format). Opening or saving a document retrieves or stores a document, respectively, on a computer-readable medium of the server. Printing the document to a file causes the translation program to run, such that the file is translated to a format suitable for prepress, and then sent to the printer.

Clicking "View" on menu bar 404 drops down the view menu, as shown in FIG. 4c. The view menu permits a user to call up different tools of the authoring program, which may have become hidden from view (e.g., by previous user choice), or previously unselected by the user. Selecting "Toolbar" calls up tool bar 406. Selecting "Move to Front/Move to Back" calls up orientation bar 408. Selecting "Color Palette" brings up color palette area 412. Selecting "Properties" brings up properties area 414. Selecting "Rulers" brings into view rulers 416 and 414, each on a side of work area 410. Finally, selecting "Grid" causes a grid to be superimposed on work area 410 (not shown in FIG. 4c).

Clicking "Edit" on menu bar 404 drops down the edit menu, as shown in FIG. 4d. The edit menu permits a user to cut, copy, paste selected elements (i.e., objects) within work area 410, or select all the elements, such that the user is then able to cut, copy, or paste all the elements. The cut, copy, and paste commands thus operate as known to those of ordinary skill within the art.

Color palette area 412 is described in conjunction with FIG. 4e. The user is able to select both stroke and fill color from a menu of predetermined colors. The stroke color refers to the color in which the boundaries of a particular object is drawn within work area 410 (not shown in

FIG. 4e), while the fill color refers to the color inside the boundaries of the particular object within work area 410. Colors may be added within the menu of predetermined colors by defining a new color, accomplished by pressing the define new colors button, which brings up window 418. Within the window, the user is able to select new colors, which are desirably the entire palette of colors available from Pantone, as known within the art. In other embodiments, colors are selected from palettes of colors available from Toyo, Focaltone, or Tru-match, as also known within the art.

Referring next to FIG. 4f, selecting the arrow tool on tool bar 406 allows the user to select an object within work area 410. Selecting the circle tool on tool bar 406 enables a user to create a circle or oval, such as that shown in work area 410 in FIG. 4f. Referring next to FIG. 4g, selecting the rectangle tool on tool bar 406 permits a user to create a rectangle, such as that shown in work area 410 in FIG. 4g. Referring next to FIG. 4h, selecting the line tool on tool bar 406 enables a user to create a line, such as that shown in work area 410 in FIG. 4h. In the creation of a circle, rectangle, or line, the authoring program performs the creation of the particular object (e.g., the circle, the rectangle, or the line) itself, and does not consult the server to determine the manner in which the object is to be created.

Conversely, selecting the text tool on tool bar 406 causes the authoring program to first allow the user to input the text to be entered on work area 410, displaying the text in a rough manner. Next, the authoring program sends the text to the server, which translates the text into an image, desirably an image in GIF format and having a maximum resolution of 4:1, which is then sent back to the client for display on work area 410. (Other image formats include JPEG and TIFF; the invention is not so limited.) This is shown in conjunction with FIG. 4i and 4j. In FIG. 4i, the user has entered the text string "Hello world" but has not yet pressed return; therefore, the text string is shown in a rough manner. Once the user presses return, the client sends the text string to the server for conversion to an image, which is then sent to the client and displayed on work area 410, as is shown in FIG. 4j. The reason this is accomplished is that different computers have different font generation engines, while the authoring program is desirably a what-you-see-is-what-you-get (WYSIWYG) program, showing the user on the display device exactly what will be printed at the printer.

Referring next to FIG. 4k, selecting the zoom tool on tool bar 406 enables a user to zoom in and out on the document within work area 410, as is shown in FIG. 4k. Referring to FIG. 4l, selecting the color picker tool (tool 450) on tool bar 406 enables a user to set a color within color palette area 412 to that of a current object within work area 410. For example, clicking within object 452 in work area 410 while using the color picker tool sets the current fill color to that of the fill color of object 452. This enables users to precisely set a color to an already existing color within the document, which is especially advantageous in situations where there are multiple shades of one color in a document, which may be difficult to discern.

Selecting the top icon within orientation bar 408 brings the currently selected object within area 410 to the front of other objects. For example, as shown in FIG. 4l, selecting the top icon while object 452 is selected (as denoted by dots outlining the rectangular boundary of the object) brings object 452 to the front, over the other object within the work area (e.g., object 454). Conversely, selecting the bottom icon within orientation bar 408 moves the currently selected object within area 410 to the back of other objects. For example, as shown in FIG. 4m, selecting the bottom icon while object 452 is selected moves object 452 to the back, behind the other object within the work area (e.g., object 454).

Computerized prepress has been described. Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiments shown. This application is intended to cover any adaptations or variations of the present invention. For example, the invention is fully intended to cover databases as well as dynamic directories, such that the term directory may be interpreted to encompass any database amenable to the invention in such an embodiment of the invention. Therefore, it is manifestly intended that this invention be limited only by the following claims and equivalents thereof.